

IN THE CLAIMS:

1. (currently amended) A mass spectrometer ~~including~~, comprising:

a source for producing particles including ions representative of chemical elements in a sample together with neutral particles and photons, said source characterized by an initial pressure an ion optics system contained in a first vacuum region for receiving particles from the source, the ion optics system ~~including~~ comprising

at least one first electrode for establishing an electrostatic field for directing a beam of said ions in a first direction from the source and

at least one second electrode for establishing an electrostatic field for diverting the beam of ions from the first direction through an angle whereby neutral particles and photons emanating from the source continue in the first direction and are separated from the beam of ions,

a quadrupole mass analyzer arrangement contained in a second vacuum region and including

a set of quadrupole fringe electrodes for receiving the beam of ions, and

a linear quadrupole mass analyzer for receiving ions directly from the set of quadrupole fringe electrodes, and

an ion detector also contained in the second vacuum region for receiving ions from the linear quadrupole analyzer,

wherein said first vacuum region is characterized by a pressure intermediate said initial pressure and said second vacuum region pressure and the set of quadrupole fringe electrodes are configured to divert the ~~ions-ion beam~~ prior to their passage of the ion beam into the linear quadrupole mass analyzer and to shield the linear quadrupole mass analyzer entrance from a substantial portion of the trajectory of the ion beam in said first vacuum region.

2. (original) A mass spectrometer as claimed in claim 1, wherein the at least one second electrode is for establishing an electrostatic field for diverting the beam of ions from the first direction through an angle and in a second direction, and the set of quadrupole fringe electrodes of the quadrupole mass analyzer arrangement receive the beam of ions in the

second direction and shield the linear quadrupole mass analyzer entrance as viewed in the second direction.

3. (previously amended) A mass spectrometer as claimed in claim 1, wherein the ion optics system comprises a first set of electrodes for establishing the electrostatic field for directing the beam of ions in the first direction, and a second set of electrodes for establishing the electrostatic field for diverting the beam of ions from the first direction through said angle.

4. (original) A mass spectrometer as claimed in claim 2, wherein at least one or more electrodes of the ion optics system are for establishing a reflecting electrostatic field for diverting the beam of ions from the first direction through said angle and in the second direction.

5. (previously amended) A mass spectrometer as claimed in claim 1, wherein the electrodes of the set of quadrupole fringe electrodes are elongate and curved to thereby define a curved path to divert the ions prior to their passage into the linear quadrupole mass analyzer.

6. (original) A mass spectrometer as claimed in claim 5, wherein the electrodes of the set of quadrupole fringe electrodes are curved such that the ions exit the set of quadrupole fringe electrodes generally in the same direction as they enter the set of quadrupole fringe electrodes, whereby an entrance end and an exit end of the set of quadrupole fringe electrodes are substantially parallel but not co-linear.

7. (original) A mass spectrometer as claimed in claim 5, wherein the electrodes of the set of quadrupole fringe electrodes are doubly curved such that the ions exit the set of quadrupole fringe electrodes generally in the same direction as they enter, whereby an entrance end and an exit end of the set of quadrupole fringe electrodes are substantially parallel and co-linear.

8. (original) A mass spectrometer as claimed in claim 5, wherein the electrodes of the set of quadrupole fringe electrodes are curved such that the ions exit the set of quadrupole fringe electrodes in a direction generally at 90° to the direction in which they enter.

9. (previously amended) A mass spectrometer as claimed in claim 1, wherein the electrodes of the set of quadrupole fringe electrodes are elongate and straight, and are tilted relative to an entry direction for the ions into the set of quadrupole fringe electrodes to thereby divert the ions from that direction prior to their passage into the linear quadrupole mass analyzer.

10. (previously amended) A mass spectrometer as claimed in claim 1, wherein the set of quadrupole fringe electrodes are configured such that as viewed in an entry direction for the ions into the set of quadrupole fringe electrodes, the electrodes of the set at least cover, and thereby shield the linear quadrupole mass analyzer entrance and thereby also shield the detector.

11. (previously amended) A mass spectrometer as claimed in claim 1, wherein the angle through which the beam of ions is diverted from the first direction is at least 10° .

12. (original) A mass spectrometer as claimed in claim 2, wherein the angle between the first direction and the second direction is substantial, being greater than 10° .

13. (original) A mass spectrometer as claimed in claim 12, wherein the substantial angle is about 90° .

14. (previously amended) A mass spectrometer as claimed in claim 1, wherein the source for producing particles including ions representative of chemical elements in a sample together with neutral particles and photons is an inductively coupled plasma source.

15. (new) The mass spectrometer of claim 1 wherein said source pressure is in the range of at least 2 to 4 Torr and said second vacuum region is at a pressure of 10^{-5} Torr or lower.